



**Corrigenda: An updated checklist of the bees
(Hymenoptera, Apoidea, Anthophila)
of Pennsylvania, United States of America.
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The recently updated checklist of the bees of Pennsylvania, USA (Kilpatrick et al. 2020) contained several unintentional errors and some specimen records require clarification. We address below: 1) GBIF data retrieval, 2) taxonomy, 3) typographical errors in the text and Suppl. material 10, 4) misattributed county-level records, 5) county-level records for species in both Fig. 3 and Suppl. material 1, 6) data sources that were omitted from the text, and 7) state species record validity. These corrections, additional details, and updated files should be used in combination with the data presented in the original publication.

GBIF data

The specimen data retrieved from GBIF.org on 07 January 2020 (GBIF Occurrence Download <https://doi.org/10.15468/dl.wghcks>) were filtered by “Scientific name”, (Andrenidae, Apidae, Colletidae, Halictidae, Megachilidae, Melittidae), “Continent” (North America), “Country or area” (United States of America), and “State/province” (PENNSYLVANIA). We have become aware that applying the geography-based terms excluded numerous records from our search results (i.e., a record was excluded if any of these fields were empty/missing when a record was originally submitted to GBIF or if there was a misspelling/variant of the search term in any of these fields). Applying a polygon/shapefile for the state and adjusting “coordinateUncertaintyInMeters”, in place of using geography-based terms, will return all records that contain coordinates within the state, regardless of how complete their other fields are. Combining this search strategy with searches that use a wider variety of geography-based terms – to retrieve records without coordinates or that have been incorrectly georeferenced – can be used to compile a thorough GBIF dataset. However, the addition of records from searches such as these is outside of the scope of the corrigenda.

Checklist taxonomy

The subfamilial classification within Apidae was intended to follow Bossert et al. (2019), however, Anthophorinae was omitted. Thus, all members of Anthophorini were intended to be included in Anthophorinae, not Apinae. Additionally, all members of Emphorini should be classified within Eucerinae, not Apinae.

The species group, *viridatum*, was unintentionally omitted from *Lasioglossum (Dialictus) dreisbachi* (Mitchell, 1960) in both the text and Suppl. material 1. *Hoplitis (Hoplitis) anthocopoides* (Schenck, 1853) is in the *adunca* species group, not *Annosmia-Hoplitis*. Furthermore, *L. (Sphecodogastra) truncatum* (Robertson, 1901) does not have a species group and is thus not in the *calceatum* group. Suppl. material 1 has been corrected per this information, and to fully reflect the checklist text, group names for six *Lasioglossum* spp. were also added: *cephalotes* group – *L. (Dialictus) cephalotes* (Dalla Torre, 1896); *platyparium* group – *L. (Dialictus) izawsum* Gibbs, 2011, *L. (Dialictus) rozeni* Gibbs, 2011, and *L. (Dialictus) simplex* (Robertson, 1901); *viridatum* group – *L. (Dialictus) georgeickworti* Gibbs, 2011 and *L. (Dialictus) katherineae* Gibbs, 2011.

Literature review records

Typographical and formatting errors that were introduced to Suppl. material 10 when the file was reformatted for publication were corrected.

Checklist legend

Some of the citations of the Legend presented on page 17 were incorrectly formatted and/or had the incorrect year listed. The corrected legend is reprinted in full here for clarity and convenience:

Legend: ¹ = Donovall and vanEngelsdorp (2010); ² = Bartomeus et al. (2013); ³ = Biddinger Laboratory Database; ⁴ = Droege Database; ⁵ = Integrated Crop Pollination (ICP) Project: Fleischer Laboratory Database; ⁶ = López-Uribe Laboratory Database; ⁷ = Mahan et al., in prep; ⁸ = Winfree Laboratory Database; ⁹ = Choate et al. (2018); ¹⁰ = Baker (1975); ¹¹ = Bouseman and LaBerge (1978); ¹² = Broemeling (1988); ¹³ = Cockerell (1908); ¹⁴ = Daly (1973); ¹⁵ = DeBarros (2010); ¹⁶ = Droege et al. (2010); ¹⁷ = Gibbs (2010); ¹⁸ = Gibbs (2011); ¹⁹ = Gibbs and Dathe (2017); ²⁰ = Gibbs et al. (2013); ²¹ = LaBerge (1969); ²² = LaBerge (1971); ²³ = LaBerge (1973); ²⁴ = LaBerge (1977); ²⁵ = LaBerge (1980); ²⁶ = LaBerge (1985); ²⁷ = LaBerge (1987); ²⁸ = LaBerge (1989); ²⁹ = LaBerge and Bouseman (1970); ³⁰ = LaBerge and Ribble (1972); ³¹ = Matteson et al. (2008); ³² = McGinley (1986); ³³ = McGinley (2003); ³⁴ = Mikulas and Barringer (2018); ³⁵ = Milliron (1973a); ³⁶ = Mitchell (1960); ³⁷ = Mitchell (1962); ³⁸ = Onufko (2017); ³⁹ = Onufko (2018); ⁴⁰ = Ordway (1966); ⁴¹ = Rehan and Sheffield (2011); ⁴² = Roberts (1972); ⁴³ = Shinn (1967); ⁴⁴ = Sidhu (2013); ⁴⁵ = Stephen (1954); ⁴⁶ = Svensson et al. (1977); ⁴⁷ = Timberlake (1975); ⁴⁸ = AMNH; ⁴⁹ = BugGuide; ⁵⁰ = Swenk (1915); ⁵¹ = PSUB; ⁵² = Rosemary Malfi Insect Collection; ⁵³ = Emily Erickson/BIML.

Checklist species records

Specimen records from Choate et al. (2018) (superscript 9) were misattributed to Erie County, instead of Crawford County. The error affected 103 species, ranging across pages 18 to 63. Of these 103 species, 30 have been recorded in both Crawford and Erie counties, and Erie is considered a new county record for nine species: *Apis (Apis) mellifera mellifera* Linnaeus, 1758; *Ceratina (Zadontomerus) strenua* Smith, 1879; *Anthidium (Anthidium) manicatum manicatum* (Linnaeus, 1758); *Megachile (Eutricharaea) rotundata* (Fabricius, 1787); *Osmia (Melanosmia) pumila* Cresson, 1864; *Andrena (Andrena) tridens* Robertson, 1902; *Halictus (Odontalictus) ligatus* Say, 1837; *Lasioglossum (Dialictus) tegulare* (Robertson, 1890); and *Lasioglossum (Leuchalictus) zonulum* (Smith, 1848). The remaining 73 species have only been recorded in Crawford County, not Erie County.

The county records for each species have been corrected in Suppl. material 1 and Fig. 3. The following additional changes were made to the species records in Suppl. material 1 and Fig. 3, to accurately reflect data presented in the checklist text: *Nomada imbricata* Smith, 1854 – Lancaster County was added; Lackawanna County was removed. *Nomada luteola* Olivier, 1812 – York County was added. *Osmia (Melanosmia)*

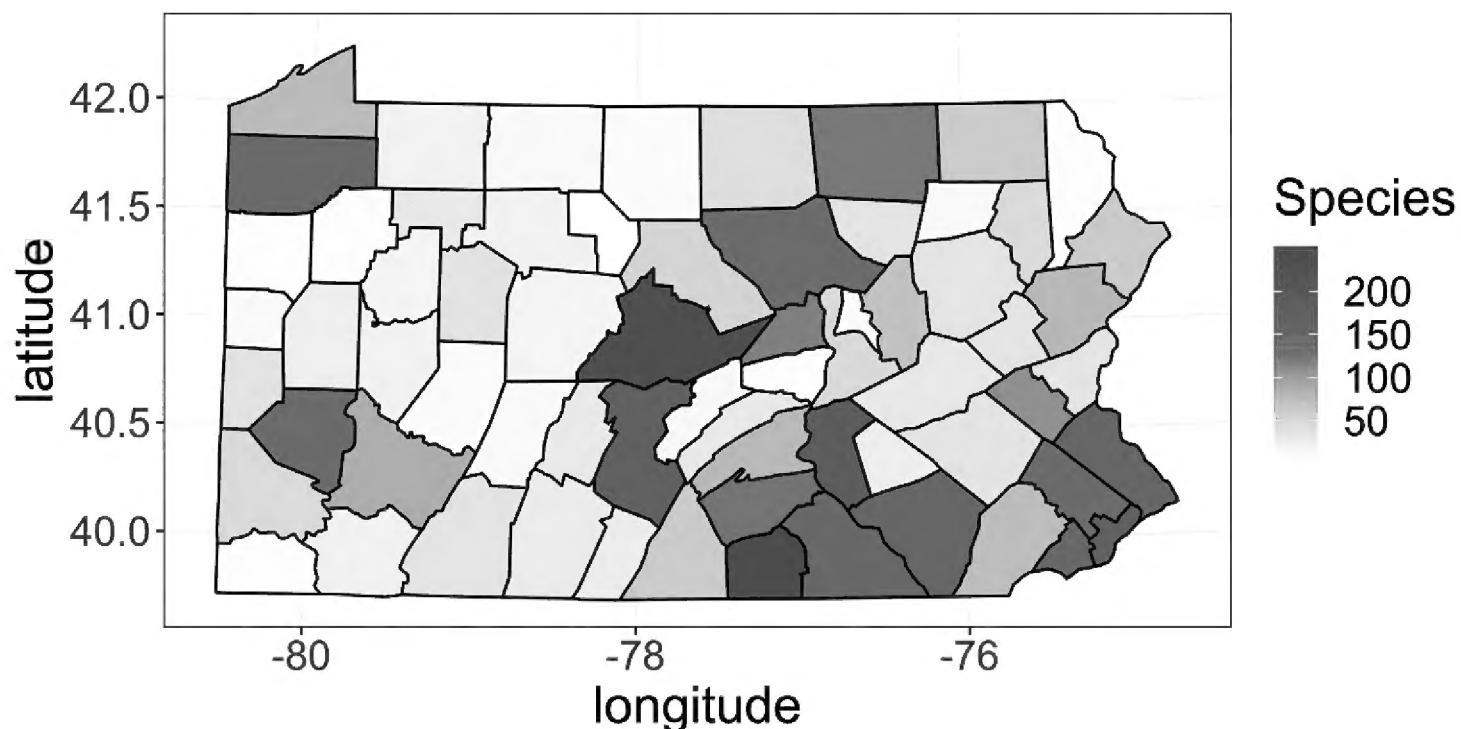


Figure 3. Choropleth map of Pennsylvania specifying bee species richness by county. The greater number of species recorded for a county, the darker blue the county is on the map; lighter-colored counties have fewer species reported from them. The number of species reports for counties ranges from one (Cameron Co.) to 246 (Adams Co.).

pumila Cresson, 1864 – Jefferson County was added; Juniata County was removed.
Andrena (Andrena) cornelli Viereck, 1907 – Schuylkill County was added.

Sources for county and/or date information reported in the checklist were partially omitted in four species' records in the checklist on pages 37, 47, 49, and 60. The data noted for each of the following species is attributable to the citation for superscript "1": *Hoplitis (Alcidamea) producta producta* (Cresson, 1864) – Butler; *Andrena (Thysandrena) w-scripta* Viereck, 1904 – Potter; *Calliopsis (Calliopsis) andreniformis* Smith, 1853 – Cumberland and Lackawanna; *Sphecodes ranunculi* Robertson, 1897 – Dauphin, Erie, Montgomery, and 14 Jul.

Additional remarks on species record verifications

Several state species records, including the following, were included on the checklist based on external data sources as provided in Kilpatrick et al. (2020). However, they were not independently verified. Since these are uncommon species or reach the limit of their ranges in Pennsylvania, it would be useful to validate these records in the future: *Bombus (Psithyrus) insularis* (Smith, 1861); *Melissodes (Eumelissodes) fumosus* La-Berge, 1961; *Triepeolus rugosus* Mitchell, 1962; *Stelis (Stelis) foederalis* Smith, 1854; *Andrena (Euandrena) phaceliae* Mitchell, 1960; *Andrena (Xiphandrena) mendica* Mitchell, 1960; *Lasioglossum (Dialictus) cephalotes* (Dalla Torre, 1896); *Lasioglossum (Dialictus) marinum* (Crawford, 1904); *Lasioglossum (Dialictus) simplex* (Robertson, 1901); *Lasioglossum (Sphecodogastra) comagenense* (Knerer and Atwood, 1964); *Sphecodes smilacinae* Robertson, 1897; and *Sphecodes solonis* Graenicher, 1911.

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Supplementary material I

Bee species of Pennsylvania: taxonomy, collection dates, persistence, and distribution data

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Data type: classification, phenology, distribution

Explanation note: The classification, earliest and latest dates of collection in both Donovall and vanEngelsdorp (2010) and Kilpatrick et al. (2020), most recent year of collection/observation in both Donovall and vanEngelsdorp (2010) and Kilpatrick et al. (2020), persistence data, and county-level occurrence data is presented for each of the 437 spp. of bees reported in Pennsylvania. This file has been corrected and updated as described in the text of the Corrigenda. This replacement file for Suppl. material 1 should be used in combination with the data in the original publication (Kilpatrick et al. 2020) and the Corrigenda.

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Link: <https://doi.org/10.3897/jhr.81.62634.suppl1>

Supplementary material 10

Pennsylvania bee species literature review records

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Data type: specimen records

Explanation note: Complete specimen literature record details for species of bees reported in Pennsylvania. Citation details, taxonomic classification (past and updated to current), type of report, occurrence details (both verbatim and transformed), and species notes are presented for 1,283 records. This file has been corrected and updated as described in the text of the Corrigenda. This replacement file for Suppl. material 10 should be used in combination with the data in the original publication (Kilpatrick et al. 2020) and the Corrigenda.

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